

AMENDMENTS TO THE SPECIFICATION

The following are replacement paragraphs for the specification including markings showing the changes made relative to the immediate prior version.

Replace paragraph (0033) with the following new paragraph (0033):

(0033) Figs. 1 and 5 illustrate a seawall 10 installed in use between a body of water 12 and retained earth 14. Seawall 10 comprises a plurality of seawall panels 16 in side by side abutment. Panels 16 are depicted as being planar with each panel having a height or span in the vertical direction, a width in the horizontal direction and a thickness perpendicular to the height and width. The width of each panel 16 extends between side edges of the panel, and the side edges of adjacent panels 16 may be in abutment as shown in Fig. 5 to form a continuous seawall 10. The seawall 10 has an upper end, which may be finished with a cap 18, normally extending above the water 12, a lower end or toe portion 20 penetrating the earthen floor 22 to extend below the water 12, a water facing side 24 and an earth facing side 26. The distance that the upper portion extends above water 12 will usually depend on the height of retained earth 14 above water 12 and/or anticipated fluctuations in the level of water 12, for example due to tides and/or storms. The toe portion 20 is typically driven into the earthen floor 22 during installation of seawall 10, and the distance the toe portion extends below the water 12 is typically selected in accordance with the depth of body of water 12, the height of retained earth 14 and/or other site-specific conditions to support the seawall in an upright vertical orientation to resist the pressure of retained earth 14.

Replace paragraph (0035) with the following new paragraph (0035):

(0035) The force or pressure exerted on seawall 10 by retained earth 14 is

ordinarily greater than the force exerted on seawall 10 by body of water 12 such that the seawall may become damaged or unstable. Damage or instability of seawall 10 may be evidenced by movement, displacement or shifting of seawall 10 from its upright vertical orientation, by openings in the seawall due to cracks in individual seawall panels 16 or separation of adjacent seawall panels 16, and/or by misalignment of seawall panels or cracked portions of panels. Various other conditions may contribute to or cause damage or instability in seawall 10 including collisions or other impacts with the seawall, corrosion and age. Where body of water 12 is deepened after construction of seawall 10, the increased depth of body of water 12 results in a reduced penetration depth for toe portion 20 below earthen floor 22 as shown by dotted line 22 in Fig. 1. Consequently, the seawall 10 may no longer be able to support or retain the retained earth 14 and may be increasingly susceptible to damage or instability. If the height of retained earth 14 is increased as shown by dotted line 14 in Fig. 1, the increased pressure ~~or~~ of retained earth exerted on seawall 10 may place the seawall at increased risk of damage or instability. In accordance with the present invention, seawall 10 is maintained by installing one or more anchoring devices to strengthen and repair the seawall where there is actual damage or instability in the seawall and/or to strengthen the seawall to resist potential damage or instability in the seawall from the pressure of earth 14 or other causes. Accordingly, maintenance of a seawall in accordance with the present invention is intended to encompass repair and/or strengthening of a seawall in cases of actual or potential damage or instability arising from the pressure of retained earth and/or other causes.

Replace paragraph (0041) with the following new paragraph (0041):

(0041) Once the passage 76 has been formed in seawall 10, the drive shaft 72 is coupled or connected with the shaft 38 of anchoring member 34 in coaxial relation or alignment. Coupling or connection of the drive shaft 72 with the shaft 38 may be performed above the water on or from the vessel 64. The drive shaft 72 having the anchoring member 34 coupled or connected thereto is positioned at angle A to seawall 10, and the drive shaft 72 is again advanced in a longitudinal or axial direction to introduce the anchoring member 34, forward end 40 first, into and through the passage 76 from the water facing side 24 to the earth facing side 26 of the seawall 10. The drive shaft 72 is rotated while continuing to be advanced in the longitudinal or axial direction to rotate and advance the anchoring member 34 into the retained earth 14 while the rearward end 42 of the shaft 38 extends from the passage 76 along the water facing side 24 of the seawall 10. The configuration of forward end 40 and anchor 44 of anchoring member 34 facilitate advancement of the anchoring member in earth 14. As it is advanced, the anchoring member 34 contacts the retained earth 14 such that the anchoring member penetrates the retained earth. Accordingly, the portion of the anchoring member 34 extending into the retained earth from the earth facing side of the seawall is embedded in the retained earth 14 without any gap or space between the anchoring member and the surrounding earth. The anchoring member 34 is advanced a preselected or predetermined distance into earth 14 such that anchor 44 is anchored and embedded in earth 14 at a preselected or predetermined distance from the earth facing side 26 of seawall 10. The configuration of anchor 44 embedded in earth 14 resists withdrawal of the anchoring member 34 from the earth 14. The shaft 38 of anchoring member 34 extends through the passage 76, and the externally threaded

rearward end 42 of shaft 38 extends from the passage 46 on the water facing side 24 of seawall 10. As shown in Fig. 1, the rearward end of shaft 38 may extend from the passage 76 into the body of water 12.

Replace paragraph (0043) with the following new paragraph (0043):

(0043) The retaining member 36 is secured on the rearward end 42 of shaft 38 along the water facing side 24 of seawall 10 with a predetermined torque to obtain a predetermined tension in anchoring member 34 and a predetermined compression against seawall 10 in an anchored position for the anchoring member. The rearward end 42 of shaft 38 is inserted in the borehole 56 of retaining member 36 with the abutment surface 54 of the retaining member facing the water facing side 24 of seawall 10. Where the retaining member 36 is provided with securing structure 62, the retaining member 36 is rotated relative to the shaft 38 in a first rotational direction with the thread 50 on the rearward end 42 in threaded engagement with the thread of borehole 56. Rotation of the retaining member 36 relative to the shaft 38 in the first rotational direction causes forward advancement of the retaining member 36 longitudinally along the shaft 38 toward seawall 10. The retaining member 36 is rotated relative to the shaft 38 in the first rotational direction to a predetermined torque with the abutment surface 54 in abutment with the water facing side 24 of seawall 10 to obtain a predetermined tension in anchoring member 34 and a predetermined compression against seawall 10. The retaining member 36 is secured on the shaft 38 in the longitudinal position corresponding to the predetermined torque, compression and tension due to engagement of thread 50 with the securing structure 62.

Replace paragraph (0049) with the following new paragraph (0049):

(0049) Figs. 3 and 4 depict an alternative anchoring device 132, the anchoring device 132 being shown in Fig. 3 installed on a seawall 10. Anchoring device 132 comprises anchoring member 134, retaining member 136 and filler 151. Anchoring member 134 is similar to anchoring member 34 except that anchor 144 for anchoring member 134 has an arm formation including a plurality of arms 147 and has a collapsible/expandable formation. Arms 147 have ends pivotally mounted to shaft 138 at a pivot location 149 such that the arms 147 are pivotable relative to the shaft 138 about the pivot location. The arms 147 extend angularly outwardly from the shaft 138 in the rearward direction in an expanded position for anchor 144 shown in Fig. 3 and in solid lines in Fig. 4. In the expanded position, the anchor 144 presents a configuration to resist withdrawal of the anchoring member 134 from earth 14 and, in the expanded position for anchor 144, the anchor presents a relatively large or wide cross-sectional profile. The arms 147 are disposed alongside shaft 138 in a collapsed position for anchor 144 shown in dotted lines in Fig. 4 such that anchor 144 presents a configuration facilitating insertion and advancement of anchoring member 134 through the seawall 10 and into earth 14 during installation. In the collapsed position, anchor 144 presents a relatively small or narrow cross-sectional profile. The anchor 144 is disposed in the collapsed position while the anchoring member 134 is being passed through the seawall 10 and advanced in the earth 14, and the anchor 144 is moved to the expanded position to be embedded in the earth 14 upon the anchoring member 134 being advanced the appropriate distance. Various mechanical mechanisms can be provided for selectively moving the anchor 144 between the collapsed and expanded positions and/or for locking the anchor 144 in the expanded position. The retaining member 136 is similar to retaining member 36 ~~436~~ 36 except that the borehole 156

through flange 152 of retaining member 136 is perpendicular to abutment surface 154. The borehole 156 may be threaded for engagement with the thread of shaft 138 or may be without a thread. The anchoring device 132 may include a securing member 162' for securing the retaining member 136 on shaft 138 when the borehole 156 is without a thread. The securing member 162' is similar to securing member 162 except that the threaded hole through securing member 162' is perpendicular to the forward face of the securing member 162'.

Replace paragraph (0056) with the following new paragraph (0056):

(0056) In a method of seawall maintenance using the apparatus of Fig. 6, the anchoring devices 232a, 232b and 232c may be installed on a seawall 10 with the anchoring member of each anchoring device placed in its anchored position in a manner similar to that described above for anchoring devices 32 and 132. Fig. 6 illustrates first and second anchoring devices 232a and 232b installed on panel 16a of seawall 10 and third anchoring device 232c installed on panel 16b of seawall 10. The first and second anchoring devices 232a and 232b are installed at laterally spaced first and second locations on seawall 10 on opposite sides of a crack 283 in panel 16a which has not yet separated or opened. Since the crack 283 extends in the horizontal direction, the first and second anchoring devices 232a and 232b are laterally spaced from and aligned with one another in the vertical lateral direction traversing crack 283. The retaining members 236 for anchoring devices 232a and 232b are positioned so that a leg 265 of first anchoring device 232a is aligned with a leg 265 of second anchoring device 232b in the vertical lateral direction traversing crack 283, and the aligned legs 265 of the first and second anchoring devices 232a and 232b extend toward each other

from their respective flanges 252. Anchoring device 232c is installed on panel 16b of seawall 10 at a third location on seawall 10 laterally spaced from and aligned in the horizontal lateral direction with the first location for anchoring device 232a. The first anchoring device 232a and the third anchoring device 232c are installed on opposite sides of a vertically extending seam 284 defined between the side edges of adjacent panels 16a and 16b, and the seam 284 has not yet separated or opened. The retaining members 236 for anchoring devices 232a and 232c are positioned so that a leg 265 of first anchoring device 232a is aligned with a leg 265 of third anchoring device 232c in the horizontal lateral direction traversing seam 284. The aligned legs 265 of the first and third anchoring devices 232a and 232c extend toward each other from their respective flanges 252.

Replace paragraph (0057) with the following new paragraph (0057):

(0057) Following installation of the first and second anchoring devices 232a and 232b with their anchoring members in their anchored positions, the method of seawall maintenance utilizing the apparatus of Fig. 6 involves rigidly interconnecting the anchoring members 234 of the first and second anchoring devices 232a and 232b to fix or maintain the separation distance between the anchoring members of the first and second anchoring devices in the vertical lateral direction and rigidly interconnecting the anchoring members 234 of the first and third anchoring devices 232a and 232c to fix or maintain the separation distance between the anchoring members of the first and third anchoring devices in the horizontal lateral direction. The first connecting member 271a is rigidly interconnected to the anchoring members 234 of the first and second anchoring devices 232a and 232b by aligning the outer ends of slots 278 of the first

connecting member 271a with the holes 267 in aligned legs 265 of the first and second anchoring devices, respectively. Bolt 269 is inserted through each pair of aligned outer ends and holes 267 and are secured in place via nuts, respectively. If desired, the holes 267 in the legs 265 of the anchoring devices may be threaded to threadably engage the bolts. The first end of the first connecting member 271a is adjacent or in abutment with the retaining member 236 of first anchoring device 232a and the second end of the first connecting member 271a is adjacent or in abutment with the retaining member 236 of second anchoring device 232b. Accordingly, the first and second anchoring devices 232a and 232b are prevented from moving inwardly toward one another in the vertical lateral direction. The anchoring devices 232a and 232b are prevented from moving outwardly away from one another in the vertical lateral direction due to engagement of bolts 269 with the closed outer ends of the slots 278 of the first connecting member 271a. Since the anchoring devices 232a and 232b are not rigidly interconnected until after installation with their anchoring members in their anchored positions, the tension and compression established with each anchoring device is independent of the tension and compression established in the other.

Replace paragraph (0058) with the following new paragraph (0058):

(0058) Following installation of the first anchoring device 232a and the third anchoring device 232c with their anchoring members in their anchored positions, the second connecting member 271b is rigidly interconnected to the anchoring members 234 of the first and third anchoring devices by aligning the outer ends of slots 278 of the second connecting member 271b with the holes 267 in the aligned legs 265 of the first and third anchoring devices, respectively. Bolts 269 are inserted through each pair of

aligned outer ends and holes 267 in the aligned legs 265 of the first and third anchoring devices and are secured in place via nuts, respectively. The first end of the second connecting member 271b is adjacent or in abutment with the retaining member 236 of the first anchoring device 232a and the second end of the second connecting member 271b is adjacent or in abutment with the retaining member 236 of the third anchoring device 232c to prevent movement of the first and third anchoring devices toward one another in the horizontal lateral direction. Movement of the first and third anchoring devices 232a and 232c away from one another in the horizontal lateral direction is also prevented due to engagement of bolts 269 with the closed outer ends of slots 278 of the second connecting member 271b. Again, the tension and compression established with anchoring device 232a is independent of that established with anchoring device 232c since the anchoring devices are not rigidly interconnected until after the anchoring devices have been installed.